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prettiest, or the richest of them myself. The other is a grand scheme, an original mercantile speculation, to surpass the Bank of England, or Pitt's Sinking Fund. He was no financier, that Pitt—would not take my advice—so much the worse for him. My plan, then, is a Card Club—which will bring golden streams into the town, more copious than Danae's shower—it will flow like the Lagan in a flood. But I will not develope my scheme; I must touch the gold first. A grand meeting to be held at the Commercial-Buildings—the attendance of the clergy of all denominations is particularly requested: especially the Seceders and Covenanters, with their respective Elders: and all ladies of fashion, in the Northern Luminary—the eye, the Emerald of Ireland. All who intend to have evening parties next winter, are earnestly invited. Regulations will be adopted to guard against the evil of *small* parties and *early* hours. None below forty to be tolerated: and none to commence before ten o'clock, or to break up before morning.—Sad falling off in these times! The plan will do more for society in a moral point of view, than Owen's visions. It will promote the refinements of social intercourse, "the feast of reason, and the flow of soul."—Elegant speeches: all ready made—a genuine Irishman is to speak—and that is,

Your humble servant,
BLARNEY LONGBOW.

REVIEW.

I. *GEOMETRICAL ANALYSIS, and GEOMETRY OF CURVE LINES, being Vol. II. of a Course of Mathematics, and designed as an Introduction to the Study of Natural Philosophy. By* JOHN LESLIE, *Esq. Corresponding Member of the Royal Institute of France, Professor of Natural Philosophy, and formerly of Mathematics, in the University of Edinburgh.—8vo. pp.* 448.—*Edin.* 1821.

II. *SUPPLEMENT to PLAYFAIR'S GEOMETRY and WOOD'S ALGEBRA, completing a Course of Mathematics, in Theory and Practice. By* THOMAS DUNCAN, *A. M. Professor of Mathematics in the University of St. Andrew's.—8vo. pp.* 846.—*London,* 1824.

WE have selected the two works named above, rather because they will afford an opportunity for considering the state of science in Scotland, than for the purpose of entering into a minute examination of their merits and contents. We conceive, indeed, that such a review of any work on abstract science would be unsuitable to the nature of our Miscellany, which we wish to render as little repulsive as possible to the general reader, by the introduction of matter which would be intelligible to few.

Scotland, with its universities and its system of parish schools, possesses, perhaps, the noblest foundation for national instruction that any country has ever enjoyed; and the efficiency of the means is fully proved by the production of a more general diffusion of education and intelligence, than an equal population in any other country can exhibit. Its means for the cultivation of the exact sciences, are also considerable; as in its five universities there are five professorships of pure mathematics, five of natural philosophy, and two of astronomy; and it has, besides, several academies of a public character—such as those of Ayr, Perth, and Inverness, the principals of which, instead of being classical masters, as in this country and England, generally give instructions in mathematics and natural philosophy. From the exertions of so many professional mathematicians, added to the number of private teachers, and of individuals who may apply themselves to the study on its own account, much may be expected to result, and much has certainly been effected. The brilliant invention of logarithms by Napier was sufficient to confer eternal honour on him and on his country. The distinguished family of the Gregorys bore a share in promoting the triumph of British science, in the days of its chief glory. Maclaurin, at a later period, supported the character of his country, and ranked high among the mathematicians of his time. His distinguished contemporary, Dr. Simson, of Glasgow, was unsurpassed as a geometrician of the old school, and may be called the antiquarian of mathematicians; and his favourite pupil and friend, Dr. Matthew Stewart, father of Dugald Stewart, the eminent metaphysician, also acquired a high reputation, especially in the same line of study more generally applied. Other names might be added, particularly those of Robison and Playfair, who were men of unquestionable talents, and of extensive acquirements in science.

Since the days of Newton, however, the British mathematicians have been far surpassed in several branches of science, by their neighbours on the continent. This has been particularly the case in the higher and more difficult parts of pure mathematics, and in physical astronomy; in which the Bernoullis, Clairault, D'Alembert, Euler, Lagrange, and Laplace, have made such discoveries as will form monuments of glory, not only to themselves, but to mankind. These great men pursued the path pointed out by Newton, and explored the mechanism of the universe, with such masterly power, and such distinguished success, as must ever be considered among the most glorious triumphs of the human mind.

While these brilliant achievements were crowning the efforts of the mathematicians on the continent, the men of science in Britain were wasting their time and talents, some in restoring the ancient geometry of Greece, and some in following servilely and implicitly the *manner* in which Newton presented his investigations, without being actuated by the *spirit* by which he was directed in his researches. Fond and proud of that eminent man almost to devotion, and prejudiced against his rivals on the continent, partly by feelings of national jealousy, and partly by the scientific war between the adherents of him and of Leibnitz, they generally clung, even in the minutest particulars, to the methods pointed out by their great leader; and, falling behind in the march of discovery, they scarcely contributed in the slightest degree, during the lapse of a century, to the advancement of science, in its higher and more difficult parts. The continental mathematicians, on the contrary, launched boldly into the untried regions of science, and were rewarded with the most brilliant discoveries; leaving to the successors of Newton little else than the reflected glories of his fame. It is but very lately, indeed, that the mathematicians of these countries, awaking from their torpor, have begun to be aware of their true situation, and to make any suitable or rational attempt at improvement. An important change, however, is now taking place, notwithstanding the prejudices and opposition of those who were instructed according to the old system; and in Cambridge and Dublin in particular, the new science, as it is sometimes termed, is making rapid strides. How little improvement has yet been effected in this respect in Scotland, the works before us will evince. One of them is the production of a leading professor in Edinburgh, and the other of a professor in St. Andrew's; and neither affords any reason to believe that the works of Euler, Lagrange, Lacroix, or Laplace, are properly known or appreciated in either seminary. We have understood, also, that the new science has not been introduced in either of the universities of Aberdeen; and we know that in the university of Glasgow, mathematical science, if it can be said even to exist, is a century behind.

In proceeding to give our readers some account of the books before us, we may state briefly, that Professor Leslie's work consists of three parts: 1. A treatise on Geometrical Analysis, in three books: 2. Geometry of the Conic Sections, or Lines of the Second Order, in two books: and 3. Geometry of the Higher Curves, in one book.

The treatise on Geometrical Analysis was originally given in the author's "Elements of Geometry," but has now, with some improvements, been made a part of the present volume;

and we conceive that it is the most valuable part of the book. The subject is by no means of equal interest with those of the remainder of the volume, particularly the second part; but the manner in which it is treated is in a high degree superior, exhibiting more correct and legitimate reasoning, and less, though still not a little, of the peculiar faults that belong to the mathematical writings of Mr. Leslie. The collection of problems which it contains, is also important in a geometrical point of view: and on the whole this tract cannot fail to be interesting to those who are fond of the Ancient Geometry, though it often fails in precision and elegance compared with the noble models of close and beautiful reasoning, and chaste expression, exhibited in the works of Euclid, Apollonius, and Simson.

The second part of the work exhibits the principal properties of the Conic Sections. The theory of these curves, which have been rendered so interesting by the astronomical discoveries of Kepler and Newton, has been deduced by some writers directly from the section of a cone, and by others from their description on a plane. Each of these methods possesses advantages peculiar to itself, but we conceive that the latter mode is preferable in no inconsiderable degree, especially for the purposes of teaching: and this is the mode pursued by Mr. Leslie. Unless greater brevity or generality, or some other considerable advantage belong to the former method, which we conceive not to be the case, there seems to be no good reason why the properties of a *plane curve* should be derived from the section of a *solid*, which, with its lines, is represented in diagrams with difficulty, and is not so easily conceived by the student. Mr. Leslie, after the example of Boscovich, has adopted, as the fundamental relation of these curves, the property, that the distances of any point in the curve from the *focus*, and from a straight line called the *directrix*, have always a constant ratio. This curious and beautiful property, which was known to the ancient mathematicians, we are inclined to regard as an excellent basis for the Geometry of the Conic Sections, on account of its completely uniting all the curves in one definition; an object which is not effected by the genesis adopted by Dr. Simson and others, who define the parabola by means of a directrix, but the ellipse and hyperbola by means of the property, that in the former the sum, and in the latter the difference, of two straight lines drawn from the foci to any point of the curve, is a constant quantity.

In the third part of the volume, we find the theory of seventeen curves presented without any classification, and to the exclusion of the lemniscata, the cardioid, the lituus, and others as interesting in their properties as several of those which he has introduced. This, however, we consider to be a matter of no consequence; as we conceive this part of the work, treated as it is, to be absolutely of no value. The author, rejecting the use of the Fluxions of Newton, and the Calculus of Leibnitz, has been obliged, in each particular case, to employ a new and often difficult train of investigation; the method which he follows in one case, rarely affording any assistance in another. In consequence of this, whole pages of intricate reasoning are employed to establish a property, that, by the powerful aids above referred to, would be derived in a few seconds; and, however far the student may have proceeded, he will find himself very little prepared to encounter new difficulties. The reasonings employed also are of a very loose and unsatisfactory nature; and the author, as has been pointed out by Mr. Lardner, has even fallen into positive error. To discover many of the properties here delivered, displayed great ingenuity in Archimedes, Roberval, Wallis, and others, who lived before Newton and Leibnitz; but to follow, at the present day, the modes of investigation employed by the original discoverers,—as Professor Leslie has done,—to the exclusion of the new aids of science, is as absurd as it would be to reject the use of the steam-engine as a prime mover for machinery. We are of opinion, indeed, that it is an absolute and improper waste of time, and of the energies of the human intellect, to attempt to determine, without the aid of the modern calculus, the curvature, areas, or lengths of curves, or to investigate their evolutes, or resolve any problems of a similar kind; and this we conceive to be nearly as applicable to the Conic Sections as to lines of a higher order. For this reason, we would consider the tract on Conic Sections, in the work before us, except in some of its simplest parts, very ill adapted for the purposes of teaching, as the higher properties which it develops may be derived far more easily and satisfactorily by means of the modern analysis; and the student, in this mode of investigation, reaps indirectly the immense advantage of acquiring such readiness and expertness in the use of the modern instruments of science, as will enable him to prosecute the study of the higher and more difficult branches, with increased facility, and with more success.*

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* Such is the power of the modern analysis, as an instrument of investigation and discovery, that by means of it a person of even moderate abilities, will be able, in less than twelve months after finishing the Elements of Euclid, and a portion of Algebra of no great extent, to effect what Mr. Leslie, or even Dr. Simson, if he were living, would find extremely difficult, if not beyond his powers, by means of the Ancient Geometry. If a new curve were proposed, for instance, many a student of no greater standing than we have mentioned above, would, in half an hour or an hour, investigate its area; its length; the contents, solid and superficial, of the body formed by its revolu-

The style and mode of expression employed in this volume, are even more vicious than those of the former works of the author, exhibiting a perpetual aim at tawdry, puerile ornament, and an affectation of variety, and of poetical and oratorical language, totally inconsistent with good taste, in a work of the kind. In mathematical reasoning, all is addressed to the judgment, and nothing to the passions or feelings; and therefore, in such reasoning, every expression of a figurative, or purely ornamental nature is to be rejected; the excellence and beauty of mathematical composition consisting in its naked simplicity, in its perspicuity, in its freedom from every thing superfluous, and in having every word used in its natural and appropriate meaning. How defective the work before us is in these respects, will appear from the following examples out of hundreds of a similar kind:—

"A tangent combined with a point *merging* the same contact." page 51. "The point *shoots into the indefinite distance*," and "the point *vanishes into extreme remoteness*." p. 281. "The triangle becomes *extinguished*." p. 329. "In the extreme *verge*, the tangents will *vanish into parallelism*." p. 333. "This rectangle BM. M*r* *melts* into the elementary space BM*mb*, while the ordinate *bm* *migrates* into BM, and the secant *passes* into a tangent." p. 346. "AE occupies a *stationary limit*, and the proximate line *ae* suffers a decrement." p. 348. "The *aggregate* arc must be double of the *accrescent* chord." p. 354. "All Cycloids are *cast on the same mould*." p. 357. "The curve *grazes* the base."p. 359. "As the *aggregate* of the increments ....is to the *cumulative* amount of the elementary arcs." &c. p. 336. "The planets would have all *shot off* from the sun in *diffusive* logarithmic spirals." p. 438. "The cissoid received its name from the Greek word for ivy, because it appears to *mount along* its asymptote in the same manner as that *parasite plant climbs on the tall trunk of the pine*." p. 330.

The following definitions, besides other faults, are unintelligible:—

"A straight line drawn on either side from the centre of an hyperbola in the extreme position of a vanishing tangent, is called an ASYMPTOTE." p. 228. "If a given straight line have one end drawn along an extended line given by position, the other line following its path or direction, will trace out a curve called the TRACTRIX or TRACTORY." p. 393.

The definition of the catenary,—"If a point, *starting* to the right or left, *gradually bend its course*," &c. is equally bad;

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tion about a straight line; the method of drawing a tangent to it; its curvature, and various other particulars respecting it, or, at least, such of these as would present no extraordinary difficulty: while the ablest Geometer of the old school would perhaps find that the easiest of these inquiries would present great difficulties and require much time, and that others of them would perhaps absolutely transcend his powers by the old mode of investigation.

and the enunciations of the propositions, in pages 420 and and 428, are unintelligible without explanation.

Mr. Duncan's book exhibits none of the pomp and pretension of the volume which we have been noticing, and so far it is well. Why it has been called a "Supplement to Playfair's Geometry and Wood's Algebra," we are at a loss to discover; as, besides containing illustrations of these works, it embraces the theory of Arithmetic, Mensuration, Land-surveying, Geography, Navigation, Fortification, Conic Sections, the application of Algebra to Geometry and Trigonometry, the Direct and Indirect Method of Fluxions, with many other particulars. The work appears to be a transcript of the notes used by the author, in lecturing to his students. Hence, we are constantly meeting with the awkwardness of addresses in the second person—"*you* get the notion," "*you* hear it stated," &c. and we are informed about "the business of *this class*" (the author's), and "of the Natural Philosophy class." An instance of this occurs in pages 269 and 270, in which the changes are rung to satiety on "this class" and others, and on what "you get here." In the same place, also, the student is directed to furnish himself "with a small atlas," "and some small work on Geography, such as Guy's Treatise, or Pinkerton's Abridgment, or both"—all very important matter, no doubt, in the *text* of a work on pure mathematics! We have also numerous, but most meagre sketches of the history and progress of mathematics. The entire work, indeed, is of a very slight and superficial nature. Too much is grasped at, and nothing is done well. Such is too frequently the character of our English courses of mathematics; and few of them exceed the work before us, in this respect. How different are the courses of Garnier and Lacroix, in French!

In the remarks on the Elements of Geometry, the reader is led to suppose that whatever has been said on the subject belongs to Playfair, as there is no hint given that for the most part Playfair's work is almost a transcript of Euclid's Elements. Thus, in page 75, we are told that "*Playfair* does not *content himself* with bidding *you* try, and *you* will find the result to hold as he has announced;" "*Playfair* makes it a rule to quote some postulate," &c.; and, in page 78, the author kindly speaks "in justification of the *conduct*" (not moral, but mathematical) "of Playfair." Mixed with these vulgarisms, however, we find some useful remarks on the first six books of Euclid, which merit the attention of the student, but which are often ill expressed. In his remarks on the twenty-sixth proposition of the first book, sides and angles are interchanged by mistake. The author has also stated, that the sixth proposition of the same book "is the first instance of an indirect demonstration;" not perceiving that the demonstration of the fourth is as essentially, though not so apparently, of that nature as any in Euclid. His attempt to demonstrate Playfair's eleventh axiom, which is the basis of the theory of parallel lines, is entirely unsatisfactory.

In the tract on Conic Sections, the same genesis is adopted as by Dr. Simson, and the principal properties are investigated geometrically. In Trigonometry, Playfair's theory is followed closely; and the reader in vain looks for the elegance to be found in the treatises of Woodhouse, Gregory, Lacroix, and Cagnoli. His FOUR METHODS of resolving right-angled spherical triangles, which turn out in the end to be but ONE method, and his cumbrous and numerous rules for "the affections of the parts," confirm this.

In Fluxions, he employs the nearly exploded English notation; and dots piled on dots, in this part of the treatise, and through the whole work, long crooked lines used as the *vinculum*, instead of the simple and elegant brackets or parenthetical marks, disfigure the operations. The notation, indeed, we consider peculiarly bad and inelegant; and we would recommend to the author to consider attentively Peacock, Babbage, and Herschel's Exercises on the Calculus,—a work which, besides its other excellencies, exhibits the neatest specimen of notation, and of mathematical typography, with which we are acquainted in the English, or any other language. The author derives the theory of Fluxions, without the consideration of motion, by means of limits, though not in the best manner. The proof of Taylor's theorem, which he has adopted, we have long considered one of the best for the purposes of teaching. That of Lagrange, even if there were no weightier objections against it, is much too abstract and difficult for the generality of students. In the theory of the *maxima* and *minima*, the author represents the variable quantity by the abscissa, and its function by the ordinate of a curve. This we consider very bad; and we would far prefer even the old axiomatic, common-sense principle, that the fluxion is nothing when the function is a maximum or minimum, because in that state the function is neither increasing nor diminishing. In the Inverse Method, he gives scarcely any rules, except those which result immediately from what was established in the Direct Method. We find no general investigation of the mode of integrating rational fractions, or of managing irrational functions; nor have we any allusion to the beautiful and simple method of integrating functions, in which the differential of an arc is multiplied by a power of the sine or cosine of the same arc. In the few instances which are given of finding fluents by logarithms, instead of establishing the rules by an analytical investigation, he gives, like some of the older writers, merely a synthetic proof, of no higher order than the proof of an operation in division by the converse process of multiplication. In this way, the student sees that the conclusion is true; but he is not taught how to discover any thing of a similar kind.

At the end of the volume there is a large collection of exercises on the preceding part of the work, left for the pupil to resolve. These are of considerable consequence ; but we conceive, there are too many of them on Geometry, and too few on the more difficult parts of the work, which would most require them.

On the whole, we consider this work to be very confused, and but indifferently composed. The same subject is again and again broken off and resumed. Thus we have Algebra taken up several times; the maxima and minima twice; Spherical Trigonometry twice, &c. In the actual business of teaching, subjects may occasionally be dropped and resumed, according to circumstances; but the unity and continuity of a book should be as little as possible interrupted in such away. On this account, as well as from its general character, we do not think this work well adapted for the purposes of teaching. At the same time it contains a slight sketch of many important subjects; and though it displays little taste, and is by no means on the plan which we consider best in the present state of science ; yet in the hands of its author as a text book, it may be made the basis of a useful system of instruction of considerable extent.

Such are the works which we regard, as affording a fair specimen of the present state of the Scottish school of pure science. We feel much pleasure in mentioning one honorable exception to the general statement which we have made. Mr. Wallace, the present Professor of Mathematics in the University of Edinburgh, is proved by his writings to be not only a man of talents and of correct mathematical taste ; but to be well acquainted with the improved analysis. How far he has been able to succeed, during the short period that has elapsed since his appointment, in improving the state of mathematics in the seminary to which he belongs, we have had no means of ascertaining; but we wish him every success in the prosecution of so desirable an object. Mr. Ivory, a native of Scotland, is also a mathematician of the highest character; and the late Mr. Spence, of Greenock, gave strong evidence of possessing talents of no ordinary kind for the cultivation and extension of science. Neither of these, however, can be regarded as belonging to the school of science in Scotland;

and they consequently form no exception to the views which we have advanced.

In this article we have confined our attention to the state of pure mathematics in Scotland. In chemistry, and in experimental philosophy in general, that country holds a far more respectable rank. Since the important discoveries of Black, whom we may regard as our townsman, great attention has been paid to these subjects in Scotland; and the same laudable spirit of inquiry is in successful operation at the present time. It is from his labours in this field of investigation, that Professor Leslie has derived the character which he enjoys. His discoveries in experimental philosophy have justly caused him to be regarded as a man of original talents; and have gained him a reputation, which his mathematical writings have perhaps tended to diminish, but by no means to increase.

In our next number, we shall notice some of the late scientific publications in Ireland, and shall take occasion to offer some remarks on the state of science in this country.

ON IRISH POOR LAWS.

TO HENRY GRATTAN, ESQ. M.P.

ON HIS PROPOSAL, MADE IN THE HOUSE OF COMMONS, UPON THE 22D INSTANT, TO INTRODUCE A MODIFICATION OF THE POOR LAWS, INTO IRELAND.

Belfast, March 30, 1825.

SIR,

You have the good fortune to bear a name, which possesses a hereditary claim upon the respect and gratitude of Irishmen. It is imperishably associated with the only few sunny days, that, for centuries, brightened the horizon of our unfortunate country. That you inherit more than the mere name of your venerated father, I am inclined to believe. The commanding powers of his intellect, the diamond sparkling of his wit, the indomitable energies of his spirit, and the resistless tide of his eloquence, it were vain to expect; but I do hope, that the unsullied mantle of his integrity, his benevolence, and his patriotism, has descended upon his son, and will be preserved without a stain. As the foundation of this hope, I have rejoiced to behold you take a deep and generous interest in every thing connected with the improvement or the sorrows of your countrymen. To a heart uncontaminated by the cold and selfish maxims of the world, nothing can be more depressing than the squalid poverty and utter destitution, that so often meet the eye in our fair and fertile island. Whilst, in numerous instances, the vigorous arm of manhood becomes nerveless, from hopeless inactivity, and the feeble voice of infancy and age pleads in vain for the meanest sustenance of nature—we instantly conclude, that such things are at variance with